

Appl. No. : 09/909,181
Filed : July 19, 2001

REMARKS

With this amendment, Claims 1-26 are pending in the present application. In view of the foregoing amendment and the following remarks, Applicant respectfully requests reconsideration and allowance of this application.

Claim Rejection-35 U.S.C. § 103

In the Advisory Action, the Examiner maintained his rejection of the claims under 35 U.S.C. §103 in view of Asada and Morinaga. Specifically, the Examiner indicated that motivation to combine the two references is established by Asada, specifically in column 1, lines 32-33 of Asada. However, after carefully reviewing Asada, Applicant notes that nowhere in Asada including the sections cited by the Examiner does it suggest or teach the concept of forming holes in the insulating layer of a multichip module. Column 1, lines 32-33 of Asada merely states that "Cu wiring layers 105a, 105j are disposed on a surface of the polyimide film 102 on the TCP." This does not suggest or teach the concept of forming enclosed regions of air in the insulating layer of the multichip structure.

Applicant also carefully reviewed the same cited sections (i.e. column 1, lines 32-33) of the Morinaga reference to determine whether the Examiner actually meant to refer to the Morinaga reference. Specifically, Applicant notes that column 1, lines 32-33 of the Morinaga reference states "Thereafter, only Al attaching to the glass coating material is selectively etched to thereby form holes within the interlayer insulating film." Again, this does not suggest or teach forming *enclosed regions of air* within an insulating layer between adjacent chips of a multichip module as disclosed in Applicant's invention. In Morinaga, the etchant has to travel through crevices and voids in the insulating material in order to reach and selectively etch away the Al grains embedded in the layer, which suggests that the voids formed after removal of the Al grains inherently cannot be *enclosed* regions of air.

Moreover, Applicant notes that the "hole formation" method disclosed in Morinaga simply would not work in the context of a multichip module. In particular, Morinaga teaches growing "strings" and "branches" between the substrate and adjacent levels of wiring. According to Morinaga, the insulating strings have a diameter of only about 1 micron and a length of only several microns. (See, e.g., Column 2, Lines 26-44 of Morinaga) As such, these strings do not have sufficient mechanical strength to support additional chip layers in the

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multichip module or to withstand the shear forces exerted on the module during assembly. If incorporated as part of the insulating layers in a multichip module, these strings are likely to collapse under the weight of additional chips because of their lower effective mechanical load bearing capacity.

It would be apparent to a person skilled in the art that the "strings" disclosed in Morinaga do not have the mechanical strength to support the weight of additional chips in a multichip module. As such, there would have been no motivation to combine Morinaga with Asada to form a multichip module having enclosed regions of air in its insulating layers as disclosed by Applicant's invention. Thus, Applicant respectfully submits that the pending claims are patentable over Asada in view of Morinaga. The Examiner also indicated that Claim 19 does not recite the limitation "forming holes within a film". To address the Examiner's concern, Applicant has amended Claim 19 to recite this particular limitation.

CONCLUSION

In view of the foregoing, Applicant respectfully submits that all pending claims of the present application are in condition for allowance, and such action is earnestly solicited. Should there be any impediment to the prompt allowance of this application that could be resolved through a telephone conference, the Examiner is respectfully requested to call the undersigned at the number shown below. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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